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(54) IMPROVEMENTS RELATING TO VEHICLE WASHING APPARATUS

(71) CONLEE CAR CARE PTY LTD

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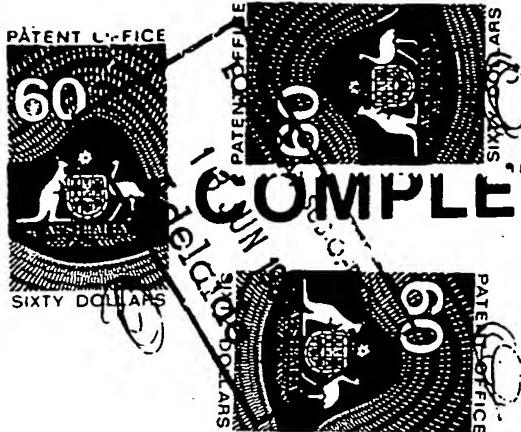
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(57) Claim

1. A car washing apparatus of a type including a spray boom arrangement adapted to travel on a track means, the track means being positioned so as to enable the spray boom arrangement to travel around the periphery of a motor vehicle, characterised by detection means adapted to detect a relevant dimension of a motor vehicle when the vehicle is in the car washing apparatus and selection means adapted to cause the spray boom to travel a selected track of the track means to enable the spray boom arrangement to travel around the periphery of a motor vehicle of different relevant dimensions.

10. A method of effecting a washing of a motor vehicle which comprises the steps of directing against the external surface of a motor vehicle at least one water spray such that the water stays as coarse droplets and the temperature at impact against the vehicles surface is in the range of 100 to 140°F and the water issues at a pressure of between 50 to 300 psi.

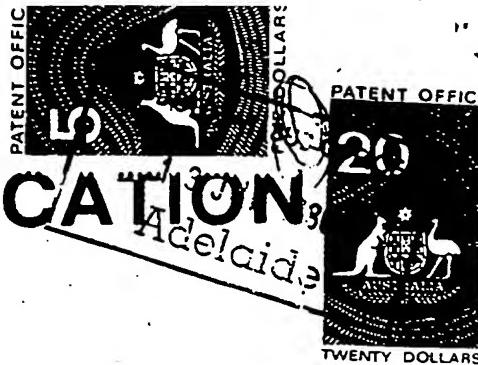


COMMONWEALTH OF AUSTRALIA

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COMPLETE SPECIFICATION

(ORIGINAL)



FOR OFFICE USE:

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Name of Applicant: CONLEE CAR CARE PTY. LTD.

Address of Applicant: a company incorporated under the laws of the State of South Australia and whose registered office is situate at Unit 4, 177 Cross Road, Westbourne Park, State of South Australia, Commonwealth of Australia

Actual Inventor:

Address for Service: care of COLLISON & CO., 117 King William Street, Adelaide, South Australia, 5000.

Complete Specification for the invention entitled: IMPROVEMENTS RELATING TO VEHICLE WASHING APPARATUS

The following statement is a full description of this invention, including the best method of performing it known to the US:

This invention relates to apparatus and methods of effecting washing of vehicles. The invention has particular application to the washing of motor vehicles but in its broadest concept is not intended to be limited thereto.

5. There are some difficult problems associated with the washing of motor vehicles where the washing process is to be carried out automatically, that is, by some form of machine and to provide an apparatus which will be effective for washing motor vehicles, whether they be large vehicles, small vehicles, hatch backs or commercial or other type of vehicles. The use of rotating brushes has been found to inflict unnecessary wear on paint coats and it can have a difficulty associated with vehicles with projections extending from the vehicles such as roof racks, external rear window louvres, radio aerials and the like.

10. To overcome this problem there has been proposed high pressure water spray devices for washing vehicles using a high pressure water or detergent solution in a relatively finely divided spray, the nozzles for the spray being carried on a common arm and being transported fully around the vehicle on a fixed track. Such tracks must, of course, be positioned so that the largest vehicle likely to be washed can be travelled around by the arm transported on the track and hence small cars will be some distance from the track. The problem exists therefore, in that because of the relatively finely divided spray, even if very hot water is used for washing the vehicle, by the time it impinges upon the vehicle, because of the very large surface area of the droplets, considerable temperature drop has occurred and what was intended to be a hot wash will at best be a warm wash. For small vehicles the problem
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worse as the very fine droplets have to travel longer distances before they reach the vehicle and may get no better than a cold wash.

- Further, such high pressure sprays result in water with detergent being driven into locations in the motor vehicle such as behind edgings that will hold the water in long term continuous contact with a surface which may be vulnerable to corrosion and this can promote unwanted deterioration and rust of the underlying metal.

10. The present invention has as its object to overcome at least some of the problems discussed above.

- In one form therefore the invention is said to reside in a car washing apparatus of a type including a spray boom arrangement adapted to travel on a track means, the track means being positioned so as to enable the spray boom arrangement to travel around the periphery of a motor vehicle, characterised by detection means adapted to detect a relevant dimension of a motor vehicle when the vehicle is in the car washing apparatus and selection means adapted to cause the spray boom to travel a selected track of the track means to enable the spray boom arrangement to travel around the periphery of motor vehicles of different relevant dimensions..

15. In one preferred form of this invention the track means may comprise a plurality of tracks and the selection means may include means to switch the spray boom arrangement to travel on a selected one of the tracks depending on the relevant dimension of the motor vehicle. There may, for instance,

be three separate tracks for small, medium and large cars.

In a further preferred form, the track means may include side sections and end sections and curved corner sections joined respective end and side sections and at least the side sections may include telescopic proportions wherein the length of the side sections may be varied in response to the detection of different lengths of motor vehicle by the detection means thereby to enable the spray boom arrangement to travel around the periphery of the motor vehicle.

It is to be realised that the invention is not limited only to extending the length of the track for longer or shorter vehicles but may also be used to change the width for narrow or wider vehicles.

In a further preferred form, the track means may comprise fixed side portions and at least one longitudinally movable end portion and telescopic portions joining the end portions to the side portions the detection means may then detect the location of the end of a motor vehicle in use and position the end portion or portions so as to enable the spray boom arrangement to travel around the periphery of the motor vehicle.

The spray boom arrangement as in any of the embodiments discussed above may include a single traveller arrangement adapted to travel around the complete periphery of the motor vehicle in use.

Alternatively, the spray boom arrangement may comprise two separate traveller arrangements, each traveller arrangement adapted to wash a side and half each of the front and the back of a motor vehicle in use.

The detection means for the present invention may comprise two detector units positioned at different levels so as to detect the presence of a motor vehicle regardless of the height of the motor vehicle or the distance of the body from the ground.

In one form, the detector means may be mounted on the spray boom arrangement itself or alternatively the detector means may be mounted on each end when the ends are movable with respect to the sides of the tracks to move with the ends of the tracks.

In a further form, the invention may be said to reside in a method of effecting the washing of a motor vehicle which comprises the steps of directing against the external surface of the motor vehicle at least one water spray such that the water stays as coarse droplets and the temperature at impact against the vehicles surface is approximately 120°F, the water issuing at a pressure of between 50lbs per square inch to 300lbs per square inch.

In one preferred embodiment of this form of the invention, the water may be directed against the motor vehicle body by means adapted to move around the periphery of the motor vehicle during the issuing of water therefrom.

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In a preferred embodiment, the spray nozzle or nozzles may be supported so as to be in the close vicinity of the vehicles surface against which water is being directed.

5. In a preferred form, the water may be directed at the vehicle to reach the vehicle surface at a temperature within the range 100 - 140°F. There may be at least two sets of nozzle arrangements to distribute spray each supported for movement around the periphery of a motor vehicle by a path different from the other. The means supporting the sets of nozzle arrangements may be arranged to cause the nozzles to assume a first position at a front central position, the method then including the steps of movement of the nozzles in a path firstly each two respective sides of the vehicle then along the respective sides of the vehicle and then across the back of the vehicle to a central position.
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20. In a further preferred form of the invention, the invention may reside in a car washing apparatus for effecting the method of washing a vehicle discussed above characterised in that there are means to support a motor vehicle and track means around said support means adapted to support and direct nozzles for water spray against a motor vehicle thus located, characterised in that the apparatus includes means to detect whether a vehicle is of greater than a selected length or width and to effect an alteration of the path of the nozzles in accordance with such detection.
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It will be seen that by this invention, in its various forms, there is provided a motor vehicle washing apparatus which has spray nozzles on a boom arrangement to travel around the periphery of a vehicle and by detecting the exact position of the vehicle such as the length of a vehicle, the boom arrangement can be caused to travel close to the vehicle so that a coarse droplet low pressure spray may be used against the vehicle so that hot water sprayed against the vehicle firstly is not in fine droplets and hence a cooling does not occur so quickly and because of the close distance of the spray boom from the vehicle minimal cooling will occur during its travel through the air and effective washing may be achieved.

The actual process of washing may include apparatus with at least three sets of spray nozzles on the spray boom arrangement with a first travelling of the spray boom arrangement around the periphery of the vehicle providing an application of a very concentrated detergent solution and then the next travel of the spray booms around the periphery of the vehicle spraying very hot water to rinse off the detergent and to carry any grease therewith and a final travelling of the spray boom arrangement around the vehicle to spray the vehicle with demineralised filtered water to give a final rinse.

This then generally describes the apparatus and method with the present but to assist with understanding of the invention and its various embodiments reference will now be made to the accompanying illustrations which show preferred embodiments of the invention.

Now looking at the drawings in general,

FIG. 1 shows an embodiment of the invention in which the track means has one end which may telescope,

5. FIG. 2 shows an alternative embodiment of the invention in which three selectable tracks are provided at one end of the vehicle,

FIG. 3 shows a general perspective view of the stylised embodiment shown in FIG. 1,

10. FIG. 4 shows a schematic layout of a typical cleaning process for a motor vehicle, and,

FIG. 5 shows an alternative embodiment of the invention in which both ends of the track telescope in and out.

15. Now looking more specifically at the drawings and in particular FIG. 1, it will be seen that this shows a stylised arrangement of a vehicle washing apparatus. The vehicle washing apparatus includes a substantially rectangular track 1 about a motor vehicle 2. A spray boom arrangement 3 travels on the track 1 with wheels 4 running on the track. The spray boom arrangement travels in the direction of the arrow 5. An arm 6 carries a detector 7 with the detector including a transmitter and a receiver transmitting, for instance, an ultrasonic signal which is adapted to reflect off a motor vehicle if there is a vehicle in the path of a detector.

30. If when the spray boom arrangement and detector reaches a point approximately 8 on the track the end of the motor vehicle has not been detected, the end 9 of the track extends on telescopic portions 10 until the detector 7 no longer detects the end of a motor vehicle 11. If the motor vehicle is much longer and ends at position 12 then the tele-

scopic portions 10 continue extending until the end portions of the track 9 is at position 13. The end portion 9 stays at the position 13 until the motor vehicle has been completely washed and the

5. vehicle has moved away and then the spray boom arrangement contracts to its original position ready for a next vehicle.

It will be realised that the spray boom arrangement may travel around the periphery of the motor vehicle several times as detergent washing hot water washing and clear water rinsing take place.

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A alternative embodiment of car washing apparatus according to this invention is shown in FIG. 2 in which the track 20 includes separate end portions 21, 22 and 23. If detector means 24 detects that it is beyond the end of the motor vehicle then the spray boom arrangement 25 travels on track 21 around the end of the vehicle. If detector 24 detects a vehicle and detector 26 does not detect a vehicle then the spray boom arrangement 25 travels onto track 22. If detector 26 detects a vehicle and detector 27 does not then track 23 is selected around the end of the vehicle. If detector 27 still detects a vehicle then spray boom arrangement 25 may be stopped as the vehicle may be too long to be washed in the apparatus.

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It will be noted that in this form of the invention the spray boom arrangement is adapted to travel from the front centre of a vehicle to the back centre of a vehicle and a corresponding spray boom arrangement on the other side does corresponding washing on the other side of the vehicle. Once again the

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spray boom arrangement may make several passes around the vehicle depending upon the number of washing and rinsing steps.

A further embodiment of car washing apparatus
5. according to this invention is shown in FIG. 3.

In this embodiment two spray boom arrangements are used each washing half of the back of a vehicle, the side of a vehicle and half of the front of a vehicle.

10. In this embodiment, elongate beams 30 and 31 extend down the full length of the car wash on each side. A U-shaped section of fixed track 32 is mounted to the beams 30 and 31 with the arms of the U substantially parallel to the beams. A travelling beam 33 is positioned transverse to the direction of elongation of the beams 30 and 31 and is supported by the beams 30 and 31 by means of travellers 34 and 35 so that the beam 33 travels along the beams 30 and 31. An end track portion 36 is mounted onto the travelling beam 33 and telescopic track portions 37 and 38 are mounted onto the end portion 36 and extend into the track 32. As the travelling beam 33 moves along the beams 30 and 31 then the end 15. 36 is also moved along and the telescopic portions 37 and 38 extend to change the length of the track 32 along which the spray boom arrangements 39 and 20. 40 travel.

Travelling beam 33 is caused to move by motor 41 driving gear wheel 42 which by chain 43 drives gear wheel 44 and hence shaft 45. The shaft 45 extends between the beams 30 and 31 and is supported on them by plummer blocks 46 and 47. Further along 25. the beams further plummer blocks 48 and 49, support 30.

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shafts which support gear wheels 50 and 51. Gear wheels 52 and 53 on shaft 45 have respective chains 54 and 55 which pass over gear wheels 52 and 50 and 53 and 51 respectively. Chain 54 is connected to beam 53 at 56 and chain 55 is connected to beam 33 at 57. Hence by driving the motor 41 the chains 54 and 55 may be caused to move both in the same direction together and hence move the travelling beam 33.

10. Travelling beam 33 also carries detectors 60 and 61 on respective arms 62 and 63 from the travelling beam 33, it will be noted that the detectors 60 and 61 are mounted at different heights so that regardless of the height of a motor vehicle when it is positioned in the car washing apparatus, some detection of the presence of the vehicle will be made by one or both of the detectors.

20. In use, when a vehicle enters the car washing apparatus and stops, it will normally be positioned at a fixed point with respect to the end of the track 65 and then the motor 41 is activated to move the travelling beam 33 in the direction of the arrow 66 until one or both of the detectors 61 and 60 detect the end of the vehicle and at that stage the motor 41 is stopped and the device is ready 25. for washing of the vehicle.

30. At this stage, spray boom arrangements 39 and 40 both travel to end 65 of the track arrangement to the centre until they reach the limit switches 67. Each spray boom arrangement is caused to travel by means of a motor 68 mounted onto the top of a spray boom arrangement which drives through shaft 69 to a rubber wheel 70 which drives along the top

of the track. The spray boom arrangement is caused to travel along the track by means of wheels 71 positioned each end of the spray boom arrangement and each side of the track.

5. At the commencement of spraying when the spray boom arrangements meet limit switches 67, a first wash which may be a strong detergent solution spray is commenced and the spray boom arrangements travel in opposite directions along the end 65 of the track and then around the corner and along the sides 72 and 73 across the telescoped sections 37 and 38 as required and onto the end 36 until they meet limit switches 74. At this stage the first stage of washing is stopped and the next stage which may be a hot water wash is commenced with the respective spray boom arrangements travelling on their respective paths back to the limit switches 67 on the end portion 65. At this stage the hot water wash is switched off and a filtered demineralised water rinse may be used again to give a final rinse to the vehicle. At this stage the washing is complete and the spray boom arrangements return to the rest positions along the sides as shown in FIG. 3.
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It will be noted that by this invention, the spray boom arrangements can be adapted to be necessary to spray only a short distance from the spray boom to the body of the vehicle being washed because the use of the travelling end portion 36 and the detectors means that an accurate fixed distance can be provided for the track of the spray boom arrangements by use of the detectors finding the exact end of the car so that more accurate positioning of the spray in relation to the car can be achieved with better washing results.

FIG. 4 shows a schematic view of the washing stages of a motor vehicle according to this invention. In this embodiment two spray boom arrangements are used, one to each side of the vehicle. The invention will be specifically discussed in relation to the spray boom on one side of the vehicle, but it is to be realised that the spray boom on the other side follows a similar path.

The spray boom starts from its rest position 81 and travels to position 82 at a front centre or rear centre of the vehicle and then travels along path 83 while spraying a concentrated detergent solution until it reaches point 84. The concentrated detergent spray is then switched off and a hot water wash spray is commenced and the spray boom travels along path 85 until it reaches point 86. At point 86, the hot water spray is stopped and a cold water rinse spray using demineralised water is used and the spray booms travel back along path 87 to point 88. The wash is then finished and the spray boom arrangement returns to point 81. It will be realised, of course, that all these paths are in fact superimposed but this generally shows the number of passes the washing arrangement does when cleaning a vehicle.

It will be realised further that some of these paths may be doubled up as for instance two traverses may be used for hot washing or rinsing. The spray booms may be stopped for a short time at the end of the detergent application to allow it to work on encrusted grease.

FIG. 5 shows an alternative embodiment in which both ends of the track are constructed to be telescopic. In this embodiment a similar form of extension arrangement as shown in FIG. 3 may be used.

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5. The invention therefore generally comprises a car washing apparatus which is manufactured to enable the travelling spray booms of the car wash arrangement to travel a close fixed distance from the vehicle. This enables the use of hot water in large droplets at low pressure to be used for washing without the problems discussed earlier.

10. It will be realised generally that although the invention has been discussed with respect to different length motor vehicles it will be realised that similar instructions may be used for different widths of motor vehicles and both ends may be adjusted in length thereby not requiring a motor vehicle to stop at a particular point within the car wash area.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A car washing apparatus of a type including a spray boom arrangement adapted to travel on a track means, the track means being positioned so as to enable the spray boom arrangement to travel around the periphery of a motor vehicle, characterised by detection means adapted to detect a relevant dimension of a motor vehicle when the vehicle is in the car washing apparatus and selection means adapted to cause the spray boom to travel a selected track of the track means to enable the spray boom arrangement to travel around the periphery of a motor vehicle of different relevant dimensions.
5. 10. 15. 20. 25. 30.
2. Car washing apparatus as in claim 1 wherein the track means comprises a plurality of tracks and the selection means include means to switch the spray boom arrangement to travel on a selected one of the tracks depending upon the relevant dimensions of the motor vehicles.
3. Car washing apparatus as in claim 1 wherein the track means includes side sections and end sections and curved corner sections joining respective end and side sections and at least the side sections including telescopic portions whereby the length of the side sections may be varied in response to the detection of different lengths of motor vehicle by the detection means thereby to enable the spray boom arrangement to travel around the periphery of the motor vehicle.
4. Car washing apparatus as in claim 1 wherein the track means comprise fixed side portions and at least one longitudinally movable end portion and telescopic portions joining the end portions to the side portions, the detection means detecting the location of the ends of a motor vehicle in use

and positioning the end portion or portions so as to enable the spray boom arrangement to travel around the periphery of the motor vehicle.

5. Car washing apparatus as in any one preceding claim wherein the spray boom arrangement includes a single traveller arrangement adapted to travel around the complete periphery of a motor vehicle in use.
6. Car washing apparatus as in any one of claims 1 to 4 wherein the spray boom arrangement includes two separate traveller arrangements, each traveller arrangement adapted to wash a side and half each of the front and back of a motor vehicle in use.
7. A car washing apparatus as in any one preceding claim wherein the detection mean comprise two detector units positioned at a different levels so as to detect the presence of a motor vehicle regardless of the height of the motor vehicle.
8. Car washing apparatus as in any one preceding claim wherein the detector means is mounted on the spray boom arrangement.
9. Car washing apparatus as in claim 3 or claim 4 wherein the detector means is mounted on the or each end to move therewith.
10. A method of effecting a washing of a motor vehicle which comprises the steps of directing against the external surface of a motor vehicle at least one water spray such that the water stays as coarse

droplets and the temperature at impact against the vehicles surface is in the range of 100 to 140°F and the water issues at a pressure of between 50 to 300 psi.

5. 11. A method of effecting a washing of a motor vehicle as in claim 10 further characterised in that the water is directed against the motor vehicle body by means adapted to move around the periphery of the motor vehicle during the issuing of water therefrom.

10. 12. A method of effecting a washing of a motor vehicle as in either of claims 10 or 11 further characterised in that a spray nozzle or a plurality of spray nozzles positioned on the means adapted to move around the periphery of the motor vehicle are supported so as to be in the close vicinity of the vehicles surface which the water is being directed to.

15. 13. A method of effecting a washing of a motor vehicle as in any one of claims 10 to 12 further characterised in that the water is directed at the vehicle to reach the vehicles surface at a temperature of approximately 120°F.

20. 14. A method of effecting a washing of a motor vehicle as in any one of the claims 10 to 13 further characterised in that there are at least two sets of spray nozzles to distribute spray each supported for movement around the periphery of a motor vehicle by a path different from the other.

25. 30. 15. A method of effecting a washing of a motor vehicle as in claim 14 further characterised in that the means supporting the nozzles are arranged to caused the nozzles to assume a first position at a front

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central position the method then including the steps of effecting movement of the nozzles in a path firstly each to respective sides of the vehicle then along the respective sides of the vehicle and then across the back of the vehicle to a central position.

5. 16. A car washing apparatus for use in the method as defined in any one of the claims 10 to 15 characterised in that there are means to support a motor vehicle and track means around said support means adapted to support and direct nozzles for water spray against a motor vehicle thus located, wherein the apparatus includes means to detect whether a vehicle is of greater than a selected length and to effect an alteration of the path of the nozzles in accordance with such detection.

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17. A method of washing a motor vehicle substantially as described in the specification with reference to and as illustrated by the accompanying drawings.

) 20. 18. Car washing apparatus substantially as hereinbefore described with reference to and as illustrated with the accompanying drawings.

Dated this 13th day of June, 1986.

CONLEE CAR CARE PTY. LTD.
By their Patent Attorneys,
COLLISON & CO



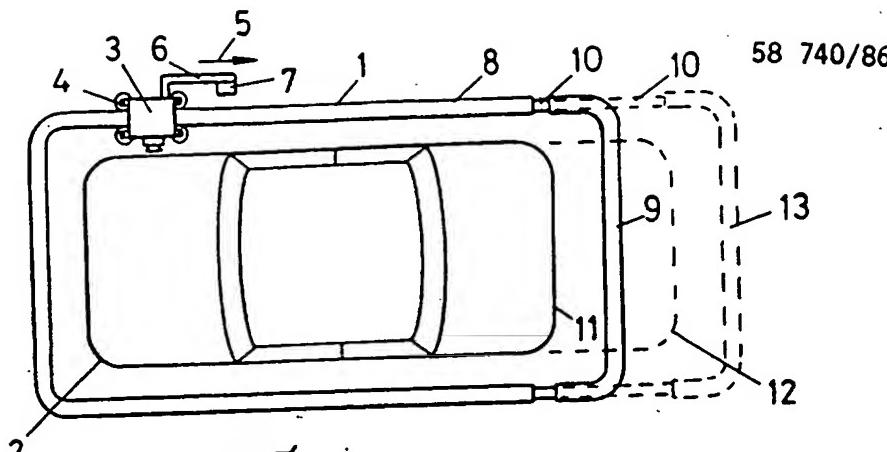


FIG 1

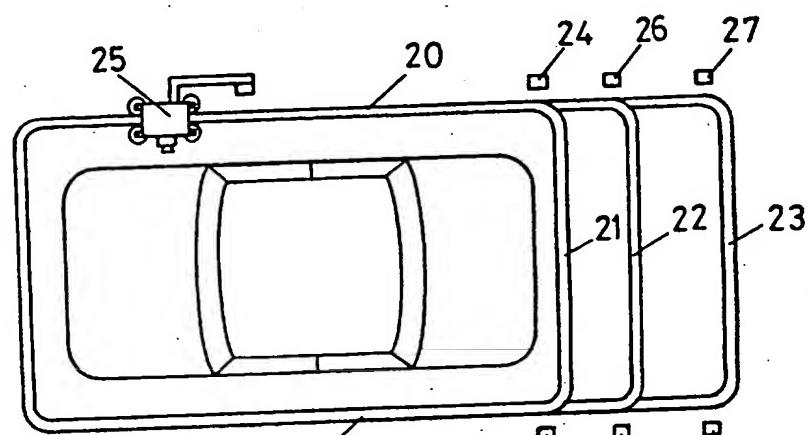


FIG 2

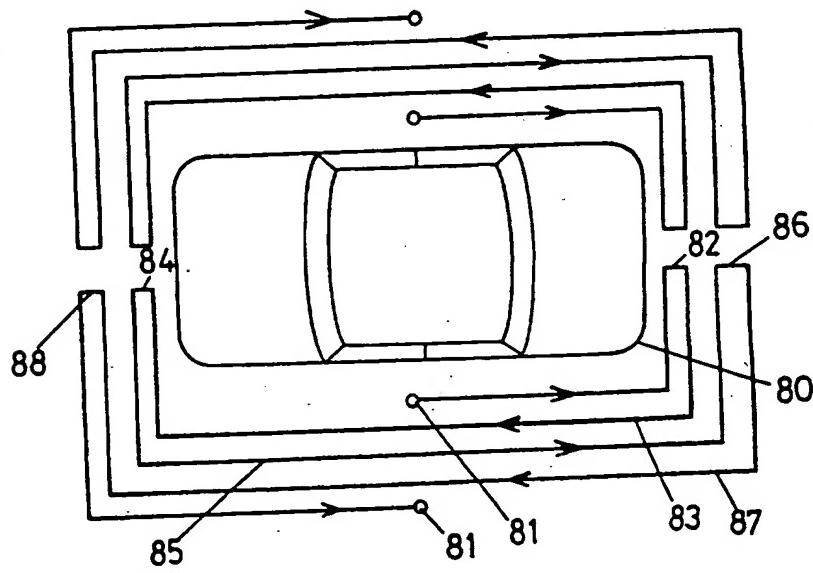


FIG 4

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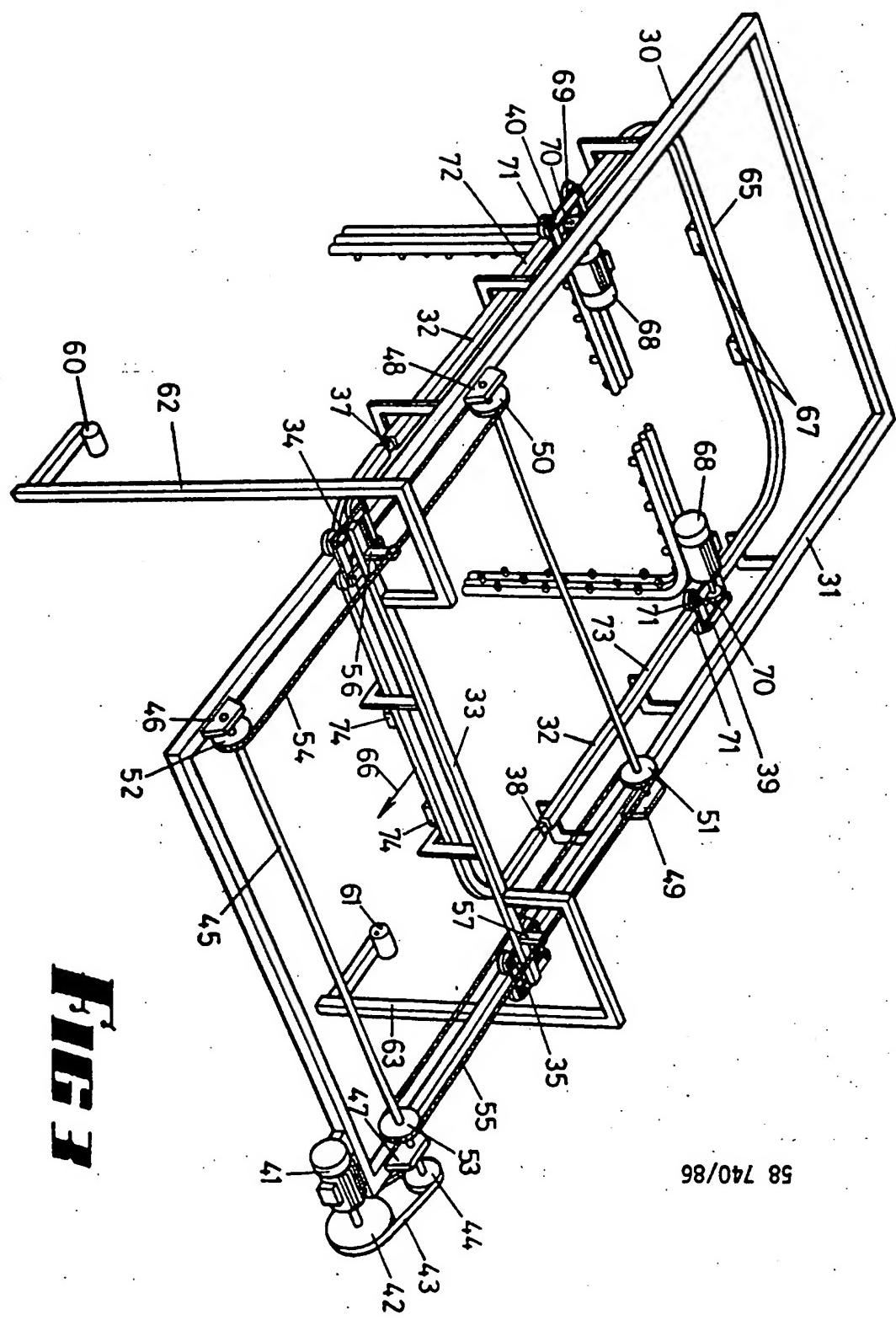


FIG 3

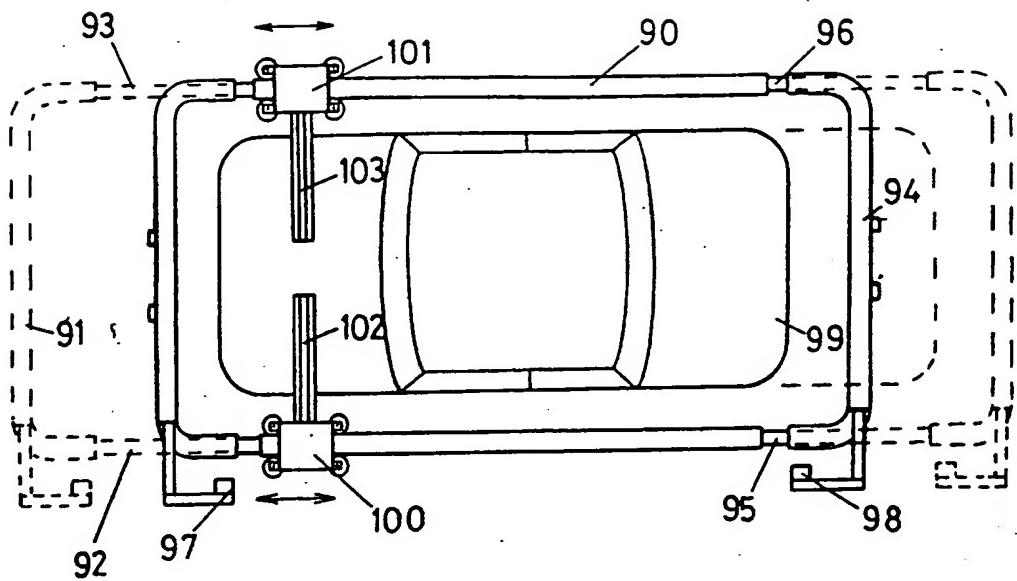


FIG 5